


**FIELD SAMPLING PLAN
FOR THE
HOLDEN SCHOOL VAPOR INTRUSION SITE
KENT, PORTAGE COUNTY, OHIO**

Prepared for
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region V

Prepared by
WESTON SOLUTIONS, INC.
Region V Superfund Technical Assessment and Response Team

September 19, 2011

Approved by: _____


U.S. EPA Region V
On-Scene Coordinator

Date: _____

10/1/2011

Project Dates of Sampling:	October, 2011
CERCLA ID / Site Spill Identifier No.:	C569
Contract Name:	START III
Contract No.:	EP-S5-06-04
Technical Direction Document No.:	S05-0001-1109-015
Document Control No.:	1609-4H-AQNN

ACRONYM LIST

CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	Environmental Protection Agency
ERB	Emergency Response Branch
OAC	Ohio Administrative Code
MS/MSD	Matrix Spike/ Matrix Spike Duplicate
NPL	National Priorities List
NEDO	Northeast District Office
OSC	On-Scene Coordinator
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
FSP	Field sampling plan
SOP	Standard Operating Procedure
START	Superfund Technical Assessment and Response Team
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WESTON	Weston Solutions, Inc.

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ATTACHMENTS

Attachment 1	REAC SOP# 2092
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1.0 Introduction

This Field sampling plan (FSP) identifies the data collection activities and associated quality assurance/quality control (QA/QC) measures specific to the Holden School Vapor Intrusion site (the “Site”). The Site is located in a mixed residential and commercial area in Kent, Portage County, Ohio (Figure 1).

All data will be generated in accordance with the quality requirements described in the *START III Generic QAPP*, dated June 2006. The purpose of this FSP is to describe site-specific tasks that will be performed in support of the stated objectives. The FSP will reference the QAPP for generic tasks common to all data collection activities including routine procedures for sampling and analysis, sample documentation, equipment decontamination, sample handling, data management, assessment, and data review. Additional site-specific procedures and/or modifications to procedures described in the *START III Generic QAPP* are described in the following FSP elements.

This FSP is prepared, reviewed, and approved in accordance with the procedures detailed in the *START III Generic QAPP*. Any deviations or modifications to the approved FSP will be documented using **Table 1: FSP Revision Form**.

2.0 Project Management and FSP Distribution and Project Team Member List

Management of the Site will be as documented in the *START III Generic QAPP*. Refer to the *START III Generic QAPP* for an organizational chart, communication pathways, personnel responsibilities and qualifications, and special personnel training requirements.

The following personnel will be involved in planning and/or technical activities performed for this data collection activity. Each will receive a copy of the approved FSP. A copy of the FSP will also be retained in the site file.

Personnel	Title	Organization	Phone Number	Email
Lori Muller	OSC	U.S. EPA	(440)250-1735	Muller.Lori@epamail.epa.gov
Frank Beodray	Project Manager	START	(440) 202-2806	Frank.Beodray@Westonsolutions.com
Ryan Green	Site Leader	START	(440) 202-2811	Ryan.Green@Westonsolutions.com
David Robinson	Health and Safety	START	(937) 531-4405	David.Robinson@Westonsolutions.com
Lisa Graczyk	QA Reviewer	START	(312) 424-3339	LGraczyk@Dynamac.com

NOTES:

OSC – On-Scene Coordinator
QA – Quality Assurance

START – Superfund Technical Assessment and Response Team
U.S. EPA – United States Environmental Protection Agency

3.0 Planning and Problem Definition

3.1 Problem Definition

Volatile organic compounds (VOC) typically associated with gasoline were detected in shallow soil vapor under the concrete slab and in indoor air at Holden Elementary School while U.S. EPA was investigating a nearby former dry cleaning facility. The gasoline-range organics are unrelated to the former dry cleaner site.

The U.S. EPA OSC has tasked START to assist with the following objectives to help determine source of the gasoline-range contamination found under Holden Elementary School:

- Obtain an access agreement from the business manager at Holden Elementary School for soil and groundwater sampling activities on school property
- Collect soil vapor and groundwater samples in open yard areas surrounding Holden Elementary School to help determine the direction to the source of the gasoline-range contamination
- Procure a driller subcontractor to install soil vapor probes and collect groundwater
- Procure a laboratory for analysis of soil vapor and groundwater samples
- Procure an environmental database records search to help identify potential sources of gasoline-range contamination in soil and groundwater within a 1-mile radius of the school

3.2 Site History and Background

Holden Elementary School is located on two parcels totalling approximately 7.2 acres in area, located at 132 W School Street in Kent, Portage County, Ohio (Figure 1). The school was built on the property in 1964. According to current operators of the school, no known fuel depots were ever located on the school property.

In June and July, 2011, U.S. EPA and START collected sub-slab and indoor air samples as part of an investigation of a nearby former dry cleaning facility to determine the potential for vapor intrusion into the school. Chlorinated organic compounds were not detected, however, chemicals typically associated with gasoline products were detected at concentrations exceeding the generic screening levels in Table 2b of the U.S. EPA 2002 Subsurface Vapor Intrusion Guidance (OSWER document EPA530-D-02-004).

U.S. EPA initiated an emergency response and mobilized START, ERRS and subcontractor personnel to install a vapor abatement system, also known as a sub-slab depressurization system (SSDS), at Holden Elementary School. The SSDS was installed while the school was vacant over the Labor Day holiday from September 2 through 5, 2011.

U.S. EPA opened a separate site assessment technical direction document (TDD) that tasked START to assist with determining potential local source(s) of the gasoline-range contaminants found under Holden Elementary School. The OSC requested that the field work on be conducted during the off-hours or weekends to avoid disturbing school activities.

3.3 Contaminants of Concern/Target Analytes

Contaminants of concern are gasoline-range VOCs. The following compounds were detected at concentrations exceeding U.S. EPA generic screening levels: benzene; 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and hexane. Ethanol, 4-ethyltoluene, toluene, xylenes, 1,4-dichlorobenzene, acetone, heptane, cyclohexane, carbon disulfide, cumene, and Freon 11 were also detected at concentrations below the generic screening levels.

4.0 Project Description and Schedule

The following tasks were requested by the U.S. EPA OSC and are anticipated to begin in late September or early October, 2011:

Task 1 – Groundwater Sampling

- Mobilize a drilling subcontractor to the Site with a track-mounted hydraulic drill rig and decontamination equipment.
- Recover soil for visual characterization, screening with a photo-ionization detector, and identification of the groundwater table depth at 12 proposed boring locations (Figure 2).
- Collect groundwater grab samples at the 12 proposed soil vapor boring locations (Figure 2).
- Ship groundwater samples to the designated laboratory for VOC analysis.

Task 2 – Soil Vapor Sampling

- Install 2 stainless steel vapor probes and tubing at each of the 12 boring locations – one vapor probe placed 1-foot above the groundwater table, and a second placed halfway between the groundwater table and the surface. The actual depths of vapor probes will be based on field observations of the groundwater table, which is estimated to be approximately 12-25 feet below ground surface in the area.
- Collect a soil vapor sample from each probe location using 6-liter SUMMA canisters and dedicated 24-hour regulators.
- Ship soil vapor samples to the designated laboratory for TO-15 VOC analysis.

Task 3 – Environmental Database Records Search

- Procure an environmental database records search for potential sources of gasoline-range VOC contamination within a 1-mile radius of the school.

A minimum of two personnel, including the OSC, will be on-site during sample collection activities inside residential homes.

Sample labels and chain-of-custody (COC) paperwork will be generated by START. Samples will be packaged and shipped or hand-delivered to the designated laboratory by START. The turnaround time for the preliminary sample data will be two weeks. A START chemist will review the final laboratory data package and produce a validation report. A Site Assessment report summarizing the sampling results and other findings will be submitted to the U.S. EPA OSC within 30 days of receipt

of analytical data.

5.0 Project Quality Objectives

5.1 Project Objectives

The U.S. EPA OSC and START designed the Site-specific sampling strategy in this FSP to determine whether a plume of gasoline-range contamination is present in soil and groundwater surrounding Holden Elementary School, determine the direction and proximity of any potential sources of gasoline contamination, and document threats to human health and the environment based on guidance in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Code of Federal Regulations (CFR) Title 40 Part 300.415(b)(2). The objective is to obtain a representative number of samples and sufficient analytical data to support defensible decisions by the U.S. EPA OSC.

The following is a list of project objectives that apply to the site assessment:

- To determine whether a removal action is warranted and if so whether the response should be classified as an emergency, time-critical, or non-time critical removal action.
- To rapidly assess and evaluate the urgency, magnitude, extent and impact of a release, or threatened release, of hazardous substances, pollutants or contaminants, and their impact on human health and/or the environment.
- To assess air quality to determine the level of personal protective equipment that must be used by site workers and the potential threat to human health.
- To supply the Ohio EPA, ODH, ATSDR, the City of Kent, or others with information about the nature and magnitude of any health threat and to support subsequent public health advisories.
- To determine a remedy to eliminate, reduce, or control risks to human health and the environment and to support an “Action” decision memorandum documenting the identified removal approach.

More information about the sampling procedures to support these objectives is provided in Section 6.

5.2 Measurement and Performance Criteria

Generic measurement and performance criteria described in the *START III Generic QAPP* will be used. These criteria will ensure that data are sufficiently sensitive, precise, accurate, and representative to support site decisions.

5.3 Data Quality Objectives

Data quality objectives address requirements that include when, where, and how to collect samples; the number of samples; and the limits on tolerable error rates. These steps should periodically be revisited as new information about a problem is learned.

Analytical data must meet all requirements for comparison to the following regulations:

Soil Vapor

- Table 2b of the U.S. EPA 2002 Subsurface Vapor Intrusion Guidance (OSWER document EPA530-D-02-004).

Groundwater

- Ohio Generic Unrestricted Potable Use Standards for Hazardous Substances in Groundwater (OAC 3745-300-8(D)).
- U.S. EPA Maximum Concentration of Contaminants for the Toxicity Characteristic (40 CFR 261.24)

6.0 Sampling Design

Laboratory-specific and method-specific requirements for sample containers, volumes, preservation, and QC samples are presented in the attached Table 2: Sampling and Analysis Summary.

Task 1 – Collection of groundwater samples

Groundwater will be collected at each of the 12 proposed soil vapor boring locations (Figure 2). The locations and total number of borings may be modified based on field observations, utility locations, and/or direction from the OSC.

Continuous recovery of soil will be conducted with the track-mounted drill rig until the groundwater table is located. Soil will be characterized on boring logs and screened with a photo-ionization detector for total VOCs. The driller operator will set a temporary well approximately 2 to 5 feet into the water bearing layer using 1-inch PVC screen and risers.

One groundwater grab sample will be collected from each temporary well using a peristaltic pump and Teflon tubing, or ½-inch HDPE bailers if necessary. Groundwater samples will be collected in pre-cleaned laboratory-provided VOA vials pre-preserved with HCl, labeled according to the nomenclature conventions in Section 6.1, and placed in a cooler on ice for delivery to the designated laboratory for analysis.

After collection of groundwater samples, the driller operator will remove each temporary well and abandon the borehole with Bentonite grout.

Task 2 – Collection of soil vapor samples

After the depth to the groundwater table has been identified at each boring location, the track-mounted drill rig will be moved approximately 2 to 3 feet away from the temporary well boring completed in Task 1. A 3-inch bore-hole will be drilled using larger drill rods down to a depth of approximately 1-foot above the groundwater table at that boring location. The driller operator will

install two subsurface vapor probes at each boring location – one approximately 1 foot above the observed groundwater table and capillary fringe, and one approximately halfway between the lower vapor probe and the surface. The groundwater table is anticipated to be 12 to 25 feet below ground surface (bgs) based on local monitoring wells and boring logs.

Each vapor probe will consist of a 6-inch stainless steel screened vapor probe provided by the driller subcontractor connected to Teflon tubing to the surface. Each vapor probe will be surrounded with filter sand pack. Bentonite grout will be filled between the vapor probe installation depths to the surface. A flush-mount road box will be installed to protect the Teflon tubing connections to the vapor probes. Each end of Teflon tubing will be labeled at the surface with the depth of the corresponding vapor probe.

A SUMMA canister and 24-hour regulator will be connected to each vapor probe at the surface, the valves will be opened, start time and initial pressure will be recorded. After approximately 24 hours, each SUMMA valve will be closed and the stop time and final pressure will be recorded. SUMMA canisters will be labeled according to the nomenclature conventions in Section 6.1, packaged, and shipped under chain of custody to the designated laboratory.

Task 3 – Procure a search of environmental database records of spills, violations, and regulatory actions at sites within a 1-mile radius of Holden Elementary School

START procured the 1-mile radius environmental database search from Environmental Data Resources, Inc. A summary of the findings will be provided in the site assessment report final deliverable.

6.1 Sample Numbering System

All samples for analysis, including QC samples, will be given a unique sample number. The sample numbers will be recorded in the field logbook and on the COC paperwork.

START will assign each sample its unique number. The sample number highlights the suspected contaminated area and location, and will be used for documentation purposes in field logbooks, as well as for presentation of the analytical data in memoranda and reports. The project samples will be identified using the following format:

Project Identification Code

HS = Holden School

Sample Type Code

SV = Soil Vapor

GW = Groundwater

Depth Code

M = Midpoint (vapor probe installed halfway between the bottom of the boring and the surface)

B = Bottom (vapor probe installed 1 foot above the capillary fringe near the bottom of each boring)

Six-Digit Date Code

mmddyy

QA/QC Identification Code

DP = Field duplicate

MS = MS/MSD

Soil vapor sample ID's will be constructed with the project identification, followed by the sample type code and a unique location number for each boring, followed by a depth code, followed by the date code, followed by the QA/QC identification, if applicable.

Examples of the **soil** sample identifications are as follows:

- **HS-SV2-B-100111** = soil vapor sample collected from the bottom vapor probe in boring number 2 on October 1, 2011.
- **HS-SV7-B-100211** = soil vapor sample collected from bottom vapor probe in boring number 7 on October 2, 2011.
- **HS-SV7-M-100211** = soil vapor sample collected from midpoint vapor probe in boring number 7 on October 2, 2011.

Groundwater sample ID's will be constructed with the project identification, followed by the sample type code and a unique location number for each boring, followed by a six-digit date code, followed by the QA/QC identification, if applicable.

Examples of the **groundwater** sample identifications are as follows:

- **HS-GW3-20** = groundwater sample collected from 20 feet bgs in boring 3.
- **HS-GW4-16** = groundwater sample collected from 16 feet bgs in boring 4.
- **HS-GW4-16-DP** = field duplicate of sample HS-GW4-16.

6.2 Management of Investigation-Derived Wastes

For purposes of this FSP, investigation-derived wastes are defined as any byproduct of the field activities that is suspected or known to be contaminated with hazardous substances. The performance of field activities will produce waste products, such as spent sampling supplies (*e.g.*, Teflon tubing, paper towels, etc.), and expendable Personal Protective Equipment (PPE). START and the driller subcontractor will also generate decontamination water.

Disposable sampling supplies and PPE will be containerized in trash bags to remain on-site pending the receipt of sample laboratory analytical results. It is anticipated decontamination water will be captured by a portable decontamination pad provided by the driller subcontractor.

7.0 Sampling Procedures

7.1 Sampling Standard Operating Procedures

The following Standard Operating Procedures (SOPs) will be used during the site evaluation:

7.2 Decontamination Procedures

General decontamination procedures are described in Section B.2 of the *START III Generic QAPP*.

All non-disposable equipment (i.e. steel bowls and scoops) will be decontaminated between sampling locations.

8.0 Sample Handling, Tracking, and Custody Procedures

All samples will be identified, handled, shipped, tracked, and maintained under COC, in accordance with the *START III Generic QAPP*.

9.0 Field Analytical Methods and Procedures

9.1 Field Analytical Methods and Standard Operating Procedures

Field screening and personal air monitoring may be conducted with a MultiRAE Plus 5-gas monitor and a ppbRAE VOC monitor during sampling activities. Air monitoring readings will be recorded in the site log book.

9.2 Field Testing Laboratory

A field testing laboratory will not be used during the site assessment.

9.3 Screening/Confirmatory Analyses

Screening/Confirmatory Analyses will not be used during the site assessment.

10.0 Fixed Laboratory Analytical Methods and Procedures

Soil Vapor Laboratory

Air Toxics Ltd.

180 Blue Ravine Road, Suite B

Folsom, CA 95630

Contact: Ausha Scott

Office: (916) 985-1020

Groundwater Laboratory

ALS Environmental

4388 Glendale Milford Road

Cincinnati, OH 45242

Contact: Jim Baxter

Office: (513) 733-5336

11.0 Quality Control Activities

11.1 Field Quality Control

The number of QC samples collected for each analytical parameter and concentration level are listed in **Table 2: Sampling and Analysis Summary**. The QC sample determination and frequency is in accordance with the *START III Generic QAPP*, Table 4.

11.2 Analytical Quality Control

QC for analytical procedures will be performed at the frequency described in the *START III Generic QAPP*, Tables 5 and 6. In addition, method-specific QC requirements will be used to ensure data quality.

11.3 Performance Evaluation Samples

Performance evaluation samples will not be used in this site assessment.

12.0 Documentation, Records, and Data Management

Documentation, record keeping, and data management activities will be conducted in accordance with the *START III Generic QAPP*, Section B.10.

13.0 Quality Assurance Assessment and Corrective Actions

Field activities are anticipated to require three days for completion; no long-term project field audit will be completed at this time.

14.0 Reports to Management

Reports to management will be written and distributed in accordance with the *START III Generic QAPP*, Section C.

15.0 Steps 1, 2 and 3: Data Review Requirements and Procedures

Step 1: Data collection activities, including sample collection and data generation, will be verified in accordance with the *START III Generic QAPP*, Section D.

Step 2: Data will be validated by WESTON START.

Step 3: Data will be reviewed for usability in accordance with the *START III Generic QAPP*, Section D.

TABLES

Table 1
FSP Revision Form

Site: Holden School Vapor Intrusion Site Assessment
OSC: Lori Muller
TDD: S05-0001-1109-015

Date	Revision Number	Proposed Change to FSP/QAPP	Reason for Change of Scope/Procedures	FSP Section Superseded	Requested By	Approved By

Table 2
Sampling and Analysis Summary

Site: Holden School Vapor Intrusion Site Assessment

OSC: Lori Muller

TDD: S05-0001-1109-015

Matrix	Analytical Parameter	Analytical Method	Containers (Numbers, Size, and Type)	Preservation Requirements	Number of Sampling Locations	Number of Field Duplicates	Number of MS/ MSDs ²	Number of Blanks (Trip, Field, Equipment Rinsate) ¹	Total Number of Samples to Lab ³	Holding Time
Soil Vapor	VOCs	TO-15	One 6-L SUMMA Canister	None	24	0	0	0	24	30 days
Groundwater	VOCs	8260B	3 40-ml VOA vials	Hydrochloric Acid to a pH <2; Cool to 4°C	12	2	1	1	15	14 days

Notes:

¹ Trip blanks are only required for VOCs in water samples.

² For the water samples designated for MS/MSDs, triple volume is required for VOCs and double volume for other water parameters.

³ Total number of samples to the laboratory does not include MS/MSD samples.

⁴ For total VOCs in soil, the sample jars and preservatives will consist of one (1) pre-weighed 40-milliter vial containing methanol preservative and two (2) pre-weighed 40-milliter vials containing sodium bisulfate preservative. An approximate 5-gram aliquot is to be placed into each sample vial.

°C – Degrees Celsius

L – Liter

ml - Milliliter

MS/MSD – Matrix Spike/Matrix Spike Duplicate

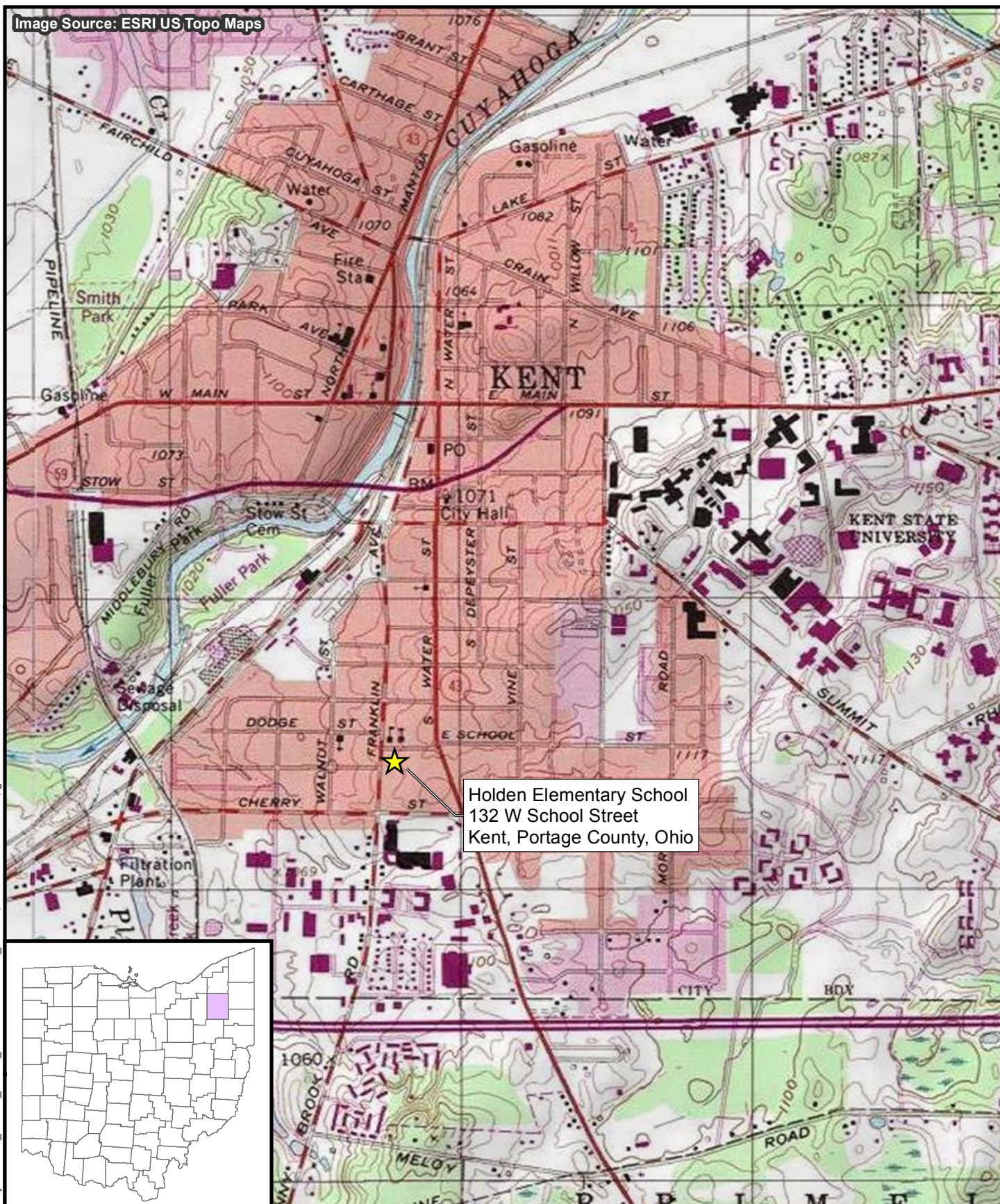
oz - Ounce

VOA – Volatile Organic Analysis

VOC – Volatile Organic Compound

FIGURES

Image Source: ESRI US Topo Maps



Holden Elementary School
132 W School Street
Kent, Portage County, Ohio



Legend

★ Holden Elementary

0 2,000
Feet



Prepared for:
U.S. EPA REGION V

Contract No.: EP-S5-06-04
TDD: S05-0001-1109-015
DCN: 1609-2A-AQNN



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Figure 1

Site Location Map
Holden School Vapor Intrusion Site
Kent, Portage County, Ohio

Imagery Source: ESRI World Imagery



Legend

- ◊ Proposed SV and GW Sampling Locations

0 100
Feet

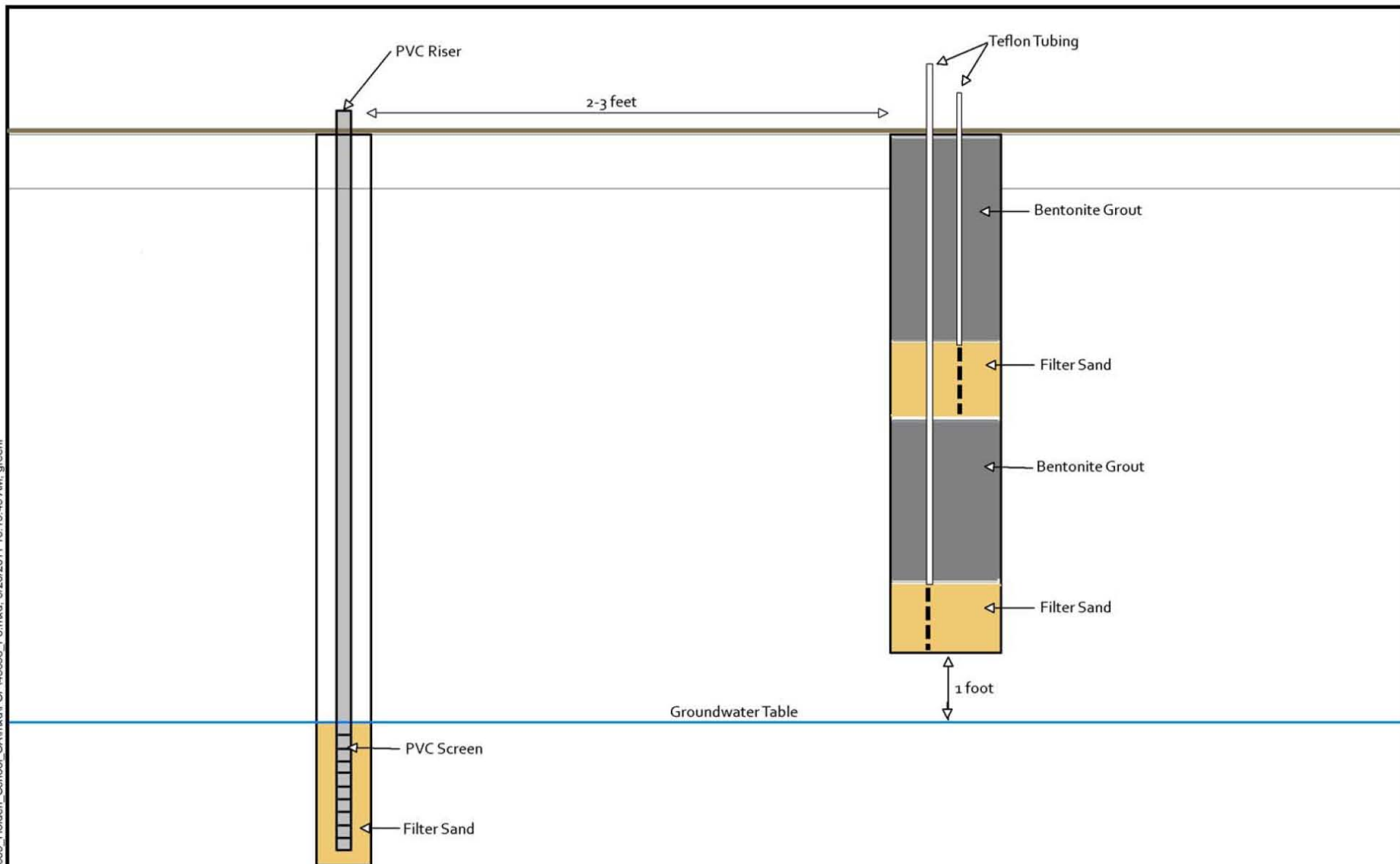


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DCN: 1609-4H-AQNN



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Figure 2
Proposed Soil Vapor and Groundwater
Sampling Locations
Holden School Vapor Intrusion Site
Kent, Portage County, Ohio



Legend

- 6-Inch Stainless Steel Vapor Probes



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Figure 3

Temporary Well and Soil Vapor
Probe Designs
Holden School Vapor Intrusion Site
Kent, Portage County, Ohio